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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/566,719

02/01/2006

Akira Ohbayashi

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KRATZ, QUINTOS & HANSON, LLP  
1420 K Street, N.W.  
Suite 400  
WASHINGTON, DC 20005

EXAMINER

MCCULLEY, MEGAN CASSANDRA

ART UNIT

PAPER NUMBER

1796

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/566,719	<b>Applicant(s)</b> OHBAYASHI ET AL.	
	<b>Examiner</b> Megan McCulley	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 7, 10-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Haraguchi et al. (WO 03/037985). Citations made to the WIPO document refer to the English language equivalent (US 2004/0254328).

Regarding claim 1: Haraguchi et al. teaches an epoxy resin composition (para. 2) comprising: a partially reacted epoxy resin and polyamine (para. 38 and 53). This would result in some amine functional epoxy resin and some unreacted epoxy resin. Therefore, the composition of Haraguchi et al. has both epoxy resin and polyamines.

Further reacted is a borate compound of the formula  $B(OR)_n(OH)_{3-n}$  (General Formula (1)) where n is 1-3 and R is a  $C_mH_{2m+1}$  alkyl group where m is 1-10. The polyamine can be aliphatic or alicyclic (para. 37). The epoxy has two or more epoxy groups in the molecule (para. 24).

Regarding claim 2: Haraguchi et al. teaches the epoxy equivalent can be from 130-1000 (para. 35).

Regarding claim 7: The components of the composition are dissolved in a solvent including lower alcohols (para. 50).

Regarding claim 10: Haraguchi et al. teaches a method comprising heating while avoiding gel formation (para. 58).

Regarding claim 11: Haraguchi et al. teaches stirring until the components are dissolved to a micron size is taught (para. 59) in an epoxy diluted with solvent (para. 50).

Regarding claim 12: Haraguchi et al. teaches the solvent is removed by drying at a temperature of 40-120°C, which overlaps the claimed range (para. 65).

Regarding claim 13: Grinding/crushing the solid resin is disclosed (para. 65) by Haraguchi et al.

Regarding claim 14: A cured product/article is taught by Haraguchi et al. of the composition cured with compression molding under heat (para. 66).

Regarding claim 15: Haraguchi et al. teaches a method for producing a heat-resistant laminate sheet, which comprises: providing an uncured coating film layer of the epoxy resin composition on the surface of a heat-resistant substrate sheet; laying/layering another heat-resistant substrate sheet on the uncured coating film layer; and curing the uncured coating film layer with thermocompression bonding/thermal contact bonding (para. 17)

Regarding claim 16: The heat-resistant laminate sheet can be copper (para. 62).

Regarding claim 17: Haraguchi et al. teaches the step of vacuum drying (para. 65).

Claims 1, 5, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawachi et al. (JP 09-157498). The English language machine translation of the Japanese document is used for the citations below.

Regarding claim 1: Kawachi et al. teaches an epoxy resin composition comprising an epoxy with two or more epoxy groups (pg. 3 para. 10) and the reaction product of a polyamine and a boric ester (abstract), the polyamine being an aliphatic amine (pg. 5 para. 23) or having an imino group (pg. 5 para. 25) and the boric ester can be trimethyl borate ester (pg. 7 para. 39) which has the instant formula where R is methyl and n is 3.

Regarding claim 5: Kawachi et al. teaches 70 parts epoxy resin, 30 parts imidazole/amine (which has 2 amino groups) and 20 parts tributyl borate ester (pg. 11 para. 61). Therefore the borate ester is the limiting reagent so there is 28 parts polyamine borate to 100 parts epoxy.

Regarding claims 8 and 9: Since Kawachi et al. used imidazole for the amino group and there is less of it than borate compound, additional unreacted imidazole will be present in the composition which will act as an additional curing agent.

Claims 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Haraguchi et al. (WO 03/037985). Citations made to the WIPO document refer to the English language equivalent (US 2004/0254328).

Regarding claims 18-20: Haraguchi et al. teaches an epoxy resin composition (para. 2) comprising: a partially reacted epoxy resin and polyamine (para. 38 and 53).

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This would result in some amine functional epoxy resin and some unreacted epoxy resin. Therefore, the composition of Haraguchi et al. has both epoxy resin and polyamines. Further reacted is a borate compound of the formula  $B(OR)_n(OH)_{3-n}$  (General Formula (1)) where n is 1-3 and R is a  $C_mH_{2m+1}$  alkyl group where m is 1-10. The polyamine can be aromatic (para. 37). The epoxy has two or more epoxy groups in the molecule (para. 24).

Claims 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawachi et al. (JP 09-157498). The English language machine translation of the Japanese document is used for the citations below.

Regarding claims 18-20: Kawachi et al. teaches an epoxy resin composition comprising an epoxy with two or more epoxy groups (pg. 3 para. 10) and the reaction product of a polyamine and a boric ester (abstract), the polyamine being an aromatic amine (pg. 5 para. 24) and the boric ester can be trimethyl borate ester (pg. 7 para. 39) which has the instant formula where R is methyl and n is 3.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haraguchi et al. (WO 03/037985). Citations made to the WIPO document refer to the English language equivalent (US 2004/0254328).

Regarding claim 4: Haraguchi et al. teaches the basic claimed composition as set forth above. While the ratio of the content of the nitrogen-containing group of the polyamine compound to the content of boron of the boric acid compound is not taught, the experimental modification of this prior art in order to ascertain optimum operating conditions fails to render applicants' claims patentable in the absence of unexpected results. See *In re Aller*, 105 USPQ 233 and MPEP 2144.05. At the time of the invention a person having ordinary skill in the art would have found it obvious to optimize the ratio of nitrogen to boron and would have been motivated to do so for such desirable properties as effective flame retardancy and reactivity with epoxy groups. A prima facie case of obviousness may be rebutted, however, where the results of the

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optimizing variable, which is known to be result-effective, are unexpectedly good. See *In re Boesch and Slaney*, 205 USPQ 215.

Regarding claim 6: Haraguchi et al. teaches the basic claimed composition as set forth above. While the amount of polyamine borate is not taught, this is a result-effective variable which can be optimized. At the time of the invention a person having ordinary skill in the art would have found it obvious to optimize the amount of polyamine borate in the composition and would have been motivated to do so for such desirable properties as fast curing without effecting the properties of the resin as well as increased flame retardancy.

### ***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Megan McCulley whose telephone number is (571)270-3292. The examiner can normally be reached on Monday - Friday 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should



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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo, Ph.D./  
Supervisory Patent Examiner, Art Unit 1796  
13-Oct-08

/M. M./  
Examiner, Art Unit 1796